Designation: D7410 – 07

Standard Practice for
Qualification of Cotton Classification Instruments for Cotton Marketing[1]

1. Scope

1.1 This practice provides two options for the qualification of cotton classification instruments: option 1, *newly installed* cotton classification instrumentation, or option 2, *annual verification* of cotton classification instrumentation using evaluation cottons, trash evaluation images, and color evaluation fiber samples for the fiber measurements of micronaire reading, upper half mean length, uniformity index, breaking tenacity (strength), Rd (color reflectance), +b (color yellowness), percent area (trash), and particle count (trash).

1.2 This practice covers the technical requirements to validate the consistency of data reported by a cotton classification instrument.

1.2.1 The practice can be used when new equipment is installed or it can be used to perform annual verification for consistency of reported data.

1.2.2 The practice can be used to qualify cotton classification instruments using evaluation cottons, trash evaluation images, and color evaluation fiber samples. These data can be used for fiber measurements of micronaire reading, upper half mean length, uniformity index, strength, color reflectance, and trash.

1.3 The values stated in English units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]
D123 Terminology Relating to Textiles

D1776 Practice for Conditioning and Testing Textiles
D2495 Test Method for Moisture in Cotton by Oven-Drying
D7139 Terminology for Cotton Fibers

2.2 *Other Documents:*
Guidelines for HVI Testing, July 2001, United States Department of Agriculture (USDA), Agricultural Marketing Service (AMS), Cotton Program, 3275 Appling Road, Memphis TN 38133 http://www.ams.usda.gov/cotton/cnpubs.htm

USDA The Classification of Cotton, April 2001, Agricultural Handbook; United States Department of Agriculture, Agricultural Marketing Service, Cotton Program, 3275 Appling Road, Memphis TN 38133 http://www.ams.usda.gov/cotton/cnpubs.htm

3. Terminology

3.1 The following terms are relevant to this standard:

3.1.1 *+b (color yellowness)*

3.1.2 *breaking tenacity (strength)*

3.1.3 *micronaire reading*

3.1.4 *particle count (trash)*

3.1.5 *percent area (trash)*

3.1.6 *rd (color reflectance)*

3.1.7 *uniformity index*

3.1.8 *upper half mean length*

3.2 *Definitions:*

3.2.1 *color evaluation fiber samples*, n—as established by United States Department of Agriculture (USDA), cotton samples based upon USDA established standard values for Rd (color reflectance) and +b (color yellowness).

3.2.2 *cotton classification instrument*, n—an integrated instrument utilized for the classification of cotton that measures micronaire reading, upper half mean length, uniformity index, breaking tenacity (strength), Rd (color reflectance), +b (color yellowness), percent area (trash) and particle count (trash).

3.2.3 *evaluation cottons*, n—as established by United States Department of Agriculture (USDA), cottons that have established standard values for micronaire reading, upper half mean length, uniformity index and breaking tenacity (strength).

3.2.4 *micronaire-specific evaluation cottons, n—as established by United States Department of Agriculture (USDA)*, cottons that have established standard values for micronaire reading.

3.2.5 *trash evaluation images, n—as established by United States Department of Agriculture (USDA)*, photographic images of reference cottons with established standard values for percent area (trash) and particle count (trash).

3.3 For all terminology related to cotton fibers, see Terminology D7139.

3.4 For all terminology related to textiles, see Terminology D123.

4. Summary of Practice

4.1 The cotton classification instrument shall perform a series of tests on evaluation cottons, trash evaluation images, and color evaluation fiber samples that shall meet established criteria for instrument qualification.

5. Significance and Use

5.1 The purpose of this practice is to provide guiding principles for the use of evaluation cottons and evaluation samples for the qualification of cotton classification instruments.

5.2 The cotton classification instruments qualified under this practice shall be capable of testing the fiber properties of micronaire reading, upper half mean length, uniformity index, breaking tenacity (strength), Rd (color), +b (color), percent area (trash) and particle count (trash).

5.3 This practice provides guidelines for users of cotton classification instruments to perform standardized testing that will ensure that test results are within acceptable tolerances (see tables below) for the marketing of cotton bales.

5.4 A test of the upper half mean length, uniformity index and breaking tenacity (strength) shall consist of an average of two (2) specimens that are prepared by an automatic mechanical sampler.

5.5 A test of the color and trash shall consist of an average of four (4) measurements with a 90 degree rotation of the color evaluation fiber samples between measurements on each sample.

5.6 The micronaire test shall consist of a single measurement.

6. Apparatus and Materials

6.1 *Cotton Classification Instrument*:

6.1.1 The precision of measurement for each property shall be as follows: micronaire to the nearest hundredth, upper half mean length to the nearest thousandth, uniformity index to the nearest tenth, breaking tenacity to the nearest tenth, Rd (color reflectance) to the nearest tenth, +b (color yellowness) to the nearest hundredth, percent area (trash) to the nearest hundredth and particle count (trash) to the nearest whole number.

6.2 *Reference Materials*:

6.2.1 The evaluation cottons, micronaire-specific evaluation cottons, trash evaluation images, and color evaluation fiber samples that shall be utilized for this practice can be obtained from the USDA, AMS, Cotton Program's Standardization and Engineering Branch. The contact information is provided below.

USDA, AMS, Cotton Program
Standardization and Engineering Branch
3275 Appling Road, Room #5
Memphis, TN 38133 USA
http://www.ams.usda.gov/cotton/
phone: 901-384-3030 / fax: 901-384-3032

6.2.2 *Evaluation Cottons*—A set of eight (8) evaluation cottons that represents a range in upper half mean length. In addition the evaluation cottons will contain a range for the measurements of micronaire reading, uniformity index, and breaking tenacity.

6.2.3 *Color Evaluation Fiber Samples (Option 1, Newly Installed)*—A set of twelve (12) color evaluation fiber samples that represent a range in Rd and +b.

6.2.4 *Color Evaluation Fiber Samples (Option 2, Annual Verification)*—A set of six (6) color evaluation fiber samples that represent a range in Rd and +b.

6.2.5 *Trash Evaluation Images (Option 1, Newly Installed)*—A set of twelve (12) trash evaluation images that represent a range in percent area and particle count.

6.2.6 *Trash Evaluation Images (Option 2, Annual Verification)*—A set of six (6) trash evaluation image that represent a range in percent area and particle count.

7. Conditioning

7.1 Condition the cotton samples a minimum of 48 hours according to the temperature and relative humidity levels as specified in Practice D1776 (21 ± 1°C (70 ± 2°F) and 65 ± 2 %).

7.2 Moisture content (dry basis) measured by resistance technique referenced to oven method Test Method D2495 shall be within 6.75 to 8.25 %.

NOTE 1—This range covers the equilibrium moisture content range for all cottons.

8. Calibration

8.1 The cotton classification instrument shall be calibrated using USDA calibration materials as specified according to the instrument manufacturer instructions.

OPTION 1—NEW INSTRUMENT EVALUATION

9. Procedure

9.1 The evaluation process for the measurements of micronaire reading, upper half mean length, uniformity index and breaking tenacity shall consist of testing eight evaluation cottons of varying levels. A total of eight test replications shall be performed on each of the eight cottons. A complete evaluation shall consist of a total of 64 tests for micronaire reading, upper half mean length, uniformity index and breaking tenacity.

9.2 The evaluation process for the individual measurement of micronaire shall consist of testing six micronaire-specific evaluation cottons of varying levels. Eight test replications shall be performed on each of the six cottons for a total of 48 tests.